CLAIMS

Amend the claims as follows.

1. (Currently amended) A sensing method for a scanner, wherein the scanner comprises ~~a motor and~~ an image sensor ~~a charge coupled device~~, and wherein the image sensor ~~charge coupled device~~ comprises a first row of sensors and a second row ~~multiple rows~~ of sensors, the sensing method comprising:

~~moving the motor during an exposure time a distance substantially equal to a width of one row of the sensors at a speed substantially equal to the width divided by the exposure time; and~~

~~concurrently~~ scanning a first document portion with the first row of sensors and concurrently scanning a second document portion with the second row ~~multiple document portions during the exposure time with the multiple rows~~ of sensors, wherein the first and the second ~~each of said multiple~~ document portions are not adjacent to each other; ~~any other of said multiple document portions, wherein each row of sensors is spaced apart from each other row of sensors, and wherein the multiple document portions are spaced apart according to spacing between the multiple rows of sensors~~

scanning a third document portion with the first row of sensors and concurrently scanning a fourth document portion with the second row of sensors, wherein the third document portion partially overlaps the first document portion; and

processing first scanned image data associated with the first document portion and second scanned image data associated with the third document portion to generate third image data of the partially overlapped document portion, wherein a resolution of the third image data is greater than a resolution of at least one of the first scanned image data and the second scanned image data.

2. (Currently amended) The sensing method according to claim 1, wherein the resolution of the third image data is double the resolution of the first scanned image data ~~distance~~

~~between rows of sensors substantially corresponds to a number of times a scan resolution is increased according to the spacing between the multiple rows of sensors~~.

3. (Currently amended) The sensing method according to claim 1, ~~wherein the motor comprises a step motor~~ further comprising:

moving the image sensor at a scanning speed, and wherein the resolution of the third image data increases with an increase in a number of rows of sensors in the image sensor without changing the scanning speed.

4. (Currently amended) The sensing method according to claim 1, wherein the first document portion does not partially overlap the fourth document portion ~~further comprising processing and re-sorting a plurality of staggered image signals to obtain a plurality of image data~~.

5. (Currently amended) A ~~sensing~~ method ~~for a scanner, to increase a resolution of the scanner to m+1 times, wherein the scanner comprises a motor and a charge coupled device, and wherein the charge coupled device further comprises m rows of sensors, the sensing method~~ comprising:

~~moving the motor during an exposure time a distance substantially equal to m/(m+1) times the width of one row of the sensors at a speed substantially equal to m/(m+1) times the width divided by the exposure time; and~~

scanning a first document portion using a first row ~~the m rows~~ of sensors of an image sensor, wherein the image sensor further comprises a second row of sensors;

moving the image sensor a width of the first row of sensors, wherein the image sensor moves at a scanning speed;

scanning a second document portion using the second row of sensors, wherein the second document portion partially overlaps the first document portion; and

processing scanned data associated with the first and second document portions to generate a complete image data for the partially overlapped document portion, wherein a resolution of the complete image data is greater than a resolution of the scanned data without changing the scanning speed ~~to concurrently scan m document portions during the exposure~~

~~time wherein each of said m document portions are not adjacent to any other of said m document portions, wherein each row of sensors is spaced apart from each other row of sensors, and wherein the m document portions are spaced apart from each other according to corresponding spacing between the m rows of sensors~~.

6. (Currently amended) The sensing method according to claim 5, wherein the first and the second row of sensors are separated by a ~~the~~ distance that is greater than or equal to the width of the first row of sensors ~~between the rows of sensors is equal to n times the width, and n is an integer equal to or larger than 0~~.

7. (Currently amended) The sensing method according to claim 5, wherein the second document portion is scanned after the first document portion, and wherein the second row of scanners is configured to scan a third document portion concurrently with the scanning of the first document portion ~~the motor comprises a step motor~~.

8. (Currently amended) The sensing method according to claim 7, wherein the third document portion is not adjacent to the first document portion ~~5, further comprising processing and re-sorting a plurality of staggered image signals to obtain a plurality of image data~~.

9. (Currently amended) An apparatus, comprising:

means for scanning a first document portion during a first exposure period; ~~allowing a scanner to have an increased scan resolution, wherein the scanner comprises a motor and a charge coupled device, and wherein the charge coupled device comprises multiple rows of sensors spaced a distance from each other, and further wherein the means for allowing comprises:~~

means for moving a scanning chassis ~~the motor during an exposure time~~ a distance substantially equal to a width of a ~~one~~ row of scanning ~~the~~ sensors ~~at a speed substantially equal to the width divided by the exposure time~~;

means for scanning a second document portion during a second exposure period, wherein the second document portion partially overlaps the first document portion; and

means for generating a complete image data for the partially overlapped document portion, wherein a resolution of the complete image data is greater than a resolution of the row of scanning sensors ~~using the multiple rows of sensors concurrently to scan multiple document portions during the exposure time wherein each of said multiple document portions are not adjacent to any other of said m document portions, and wherein the multiple document portions are spaced apart from each other according to corresponding spacing between the multiple rows of sensors~~.

10. (Currently amended) The apparatus of claim 9, wherein the resolution of the complete image data increases with an increase in a number of rows of scanning sensors without changing a scanning speed of the scanning chassis ~~the distance between rows of sensors substantially corresponds to a number of times a scan resolution is increased according to the spacing between the multiple rows of sensors~~.

11. (Currently amended) A method, comprising:

scanning concurrently a first portion and a second portion of a document using a first row of sensors for the first document portion and a second row of sensors for the second document portion, wherein the first and second document portions are not adjacent to each other, ~~wherein each of the first and second rows of sensors includes a plurality of sensors to detect three primary colors,~~ and wherein the first and second rows of sensors are spaced apart from each other~~, and wherein the first and second document portions are separated according to spacing between the first and second rows of sensors~~;

scanning concurrently a third portion and a fourth portion of a document using the first row of sensors for the third document portion and the second row of sensors for the fourth document portion, wherein the third and first ~~fourth~~ document portions partially overlap ~~are not adjacent to~~ each other; and

processing scanned ~~sorting~~ data associated with the first and third document portions from the first and second rows of sensors to produce image data for the partially overlapped document portion.

12. (Currently amended) The method of claim 11, wherein a resolution of the image data is greater than a resolution of the scanned data ~~the first and second rows of sensors are spaced apart from each other at least a distance of one quarter of the width of each of the rows of sensors~~.

13. (Currently amended) An apparatus, comprising:

means for scanning concurrently a first portion and a second portion of a document using a first row of sensors for the first document portion and a second row of sensors for the second document portion, wherein the first and second document portions are not adjacent to each other, and wherein the first and second rows of sensors are spaced apart from each other~~, and wherein the first and second document portions are separated according to spacing between the first and second rows of sensors~~;

means for moving an image sensor a distance equal to a width of the first row of sensors, wherein the image sensor comprises the first and second row of sensors;

means for scanning concurrently a third portion and a fourth portion of the document using the first row of sensors for the third document portion and the second row of sensors for the fourth document portion, wherein the third and fourth document portions are not adjacent to each other, and wherein the third document portion partially overlaps the first document portion; and

means for generating image ~~sorting~~ data for the partially overlapped document portion by combining scanned data associated with the first and third document portions from the first and second rows of sensors ~~to produce image data~~.

14. (Currently amended) The apparatus of claim 13, wherein the third document portion is scanned after the first document portion is scanned, and wherein a resolution of the image data is greater than a resolution of the scanned data ~~first and second rows of sensors are spaced apart from each other at least a distance of one quarter of the width of a row of sensors~~.

15. (Currently amended) A method, comprising:

scanning ~~a first portion of~~ a first scanning region using a first array of sensors during a first time period, wherein the first scanning region comprises a first document portion and a second document portion;

scanning a second ~~portion of said first~~ scanning region using a second array of sensors during a second time period, wherein the second scanning region comprises the second document portion and a third document portion; and

processing scanned data associated with the first and second scanning regions to generate a complete image data for the second document portion ~~scanning a portion of a second scanning region using the first array of sensors during the second time period, wherein the first and second of the plurality of scanning regions are not adjacent to each other~~, wherein the first and second arrays of sensors are spaced apart from each other, and wherein a resolution of the complete image data is greater than a resolution of the scanned data ~~the first and second of the plurality of scanning regions are separated according to spacing between the first and second arrays of sensors~~.

16. (Currently amended) The method of claim 15, further comprising:

moving a scanning chassis a first distance equal to a width of the first array of sensors while the first scanning region is being scanned, wherein the scanning chassis comprises the first and second array of sensors; and

moving the scanning chassis a second distance equal to a width of the second array of sensors while the second scanning region is being scanned ~~sorting data from the first and second arrays of sensors to assemble image data~~.

17. (Currently amended) An apparatus, comprising:

means for scanning a ~~first portion of a~~ first scanning region using a first array of sensors during a first time period, wherein the first scanning region comprises a first portion and a second portion;

means for scanning a second ~~portion of said first~~ scanning region using a second array of sensors during a second time period, wherein the second scanning region comprises the second portion and a third portion;

means for moving the first and second array of sensors at a scanning speed; and

means for processing scanned data associated with the first and second scanning regions to generate a complete image data for the second document portion, wherein a resolution of the complete image data is greater than a resolution of the scanned data without changing the scanning speed ~~scanning a portion of a second scanning region using the first array of sensors during the second time period, wherein the first and second of the plurality of scanning regions are not adjacent to each other, wherein the first and second arrays of sensors are spaced apart from each other, and wherein the first and second of the plurality of scanning regions are separated according to spacing between the first and second arrays of sensors~~.

18. (Currently amended) The apparatus of claim 17, wherein the first and second array of sensors are configured to concurrently scan different scanning regions, and wherein the different scanning regions are not adjacent to each other ~~further comprising means for sorting data from the first and second arrays of sensors to assemble image data~~.

19. (Currently amended) A scanning device, comprising:

~~a motor; and~~

an image sensor ~~a charge-coupled device~~ comprising a plurality of ~~m~~ rows of sensors, wherein each of the plurality of ~~m~~ rows of sensors are spaced apart from each other;

a motor, wherein the motor is ~~adapted~~ configured to move the image sensor, during an exposure time, a distance substantially equal to a width of one of the ~~row~~ plurality of rows of sensors at a speed substantially equal to the width divided by the exposure time, ~~and~~ wherein the plurality of ~~m~~ rows of sensors are adapted to concurrently scan a first set of ~~m~~ document portions during the exposure time, and wherein each portion of the first set of ~~m~~ document portions is ~~are~~ not adjacent to any other portion of the first set of ~~m~~ document portions~~, wherein the m document portions are separated from each other according to corresponding spacing between the m rows of sensors~~; and

a processor configured to process first scanned image data associated with the first set of document portions together with second scanned image data associated with a second set of document portions to generate a third image data, wherein the third image data comprises an improved resolution compared with either of the first and second scanned image data.

20. (Currently amended) The scanning device of claim 19, wherein each portion of the second set of document portions is not adjacent to any other portion of the second set of document portions ~~the distance between the rows of sensors is substantially equal to (x/m)+n times of the width, wherein x is a positive integer smaller than m, and n is an integer equal to or larger than 0~~.

21. (Currently amended) The scanning device of claim 20, wherein the first set of document portions is scanned during a first exposure time, and wherein the second set of document portions is scanned during a second exposure time ~~19, further comprising a circuit adapted to sort a plurality of staggered image signals from the m rows of sensors~~.

22. (Currently amended) A scanning device, comprising:

~~a motor; and~~

~~a charge-coupled device comprising~~ a first row of sensors configured to scan a first document region comprised of a first portion and a second portion;

a second row ~~m rows~~ of sensors configured to scan a second document region comprising the second portion and a third portion, wherein the second row of ~~each of the m rows of~~ sensors is ~~are~~ spaced apart from the first row of sensors; ~~each other,~~

a motor configured ~~wherein the motor is adapted~~ to move a scanning chassis, during a first ~~an~~ exposure time, a distance substantially equal to ~~m/(m+1) times~~ a width of the first ~~one of the~~ row of sensors, wherein the motor is further configured to move the scanning chassis, during a second exposure time, a distance substantially equal to a width of the second row of sensors; and

a processor configured to process scanned data associated with the first and second document regions, wherein the processor is further configured to generate a complete image data for the second portion from the scanned data, and wherein a resolution of the complete image data is greater than a resolution of the scanned data ~~at a speed substantially equal to m/(m+1) times the width divided by the exposure time, and wherein the m rows of sensors are adapted to concurrently scan m document portions during the exposure time wherein each of the m document portions are not adjacent to any other of the m document portions, and wherein the m~~

~~document portions are separated from each other according to corresponding spacing between the m rows of sensors~~.

23. (Currently amended) The scanning device of claim 22, wherein the motor is configured to move the scanning chassis at a constant scanning rate during both the first and second exposure times ~~distance between the rows of sensors is equal to n times the width, and n is an integer equal to or greater than 0~~.

24. (Currently amended) The scanning device of claim 22, wherein the first document region is scanned during the first exposure time, and wherein the second document region is scanned during the second exposure time ~~further comprising a circuit adapted to sort a plurality of staggered image signals from the m rows of sensors~~.

25. (New) The scanning device of claim 22, wherein the first and second rows of sensors are positioned in a single image sensor.

26. (New) The scanning device of claim 22, wherein the first portion of the first document region does not overlap with the third portion of the second document region.

27. (New) The sensing method according to claim 3, further comprising:

scanning a fifth document portion with a third row of sensors of the image sensor, wherein the fifth document portion partially overlaps both the first document portion and the third document portion; and

processing fourth scanned image data associated with the fifth document portion to generate fifth image data of the partially overlapped document portion, wherein the resolution of the fifth image data is triple the resolution of the fourth scanned image data.